

REMARKS

In the Office Action, claims 17, 20, and 21 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 7,198,223 to Phelps III et al. ("Phelps") in view of U.S. Patent No. 6,084,368 to Doemens et al. ("Doemens") and U.S. Patent No. 6,934,167 to Jang et al. ("Jang"). Claims 18 and 19 were rejected under 35 U.S.C. §103(a) as being unpatentable over Phelps in view of Doemens and Jang as applied to claim 17 above, and further view of U.S. Patent No. 6,231,013 to Jaenker ("Jaenker"). Claim 25 was rejected under 35 U.S.C. §103(a) as being unpatentable over Phelps in view of Doemens and Jang, and further in view of U.S. Patent No. 6,232,775 to Naitoh et al. ("Naitoh"). Claims 26 and 27 were rejected under 35 U.S.C. §103(a) as being unpatentable over Phelps in view of Doemens and Jang, and further view of U.S. Patent No. 5,798,622 to Hirai et al. ("Hirai"). Claims 22, 28, and 29 were rejected under 35 U.S.C. §103(a) as being unpatentable over Phelps, Doemens, Jang, and Jaenker, and further in view of Japanese Patent No. 07-046864 to Kurakawa et al. ("Kurakawa").¹

In this response, claims 18, 22, and 23 have been cancelled without prejudice or disclaimer of the subject matter recited therein. Claims 17, 28, and 29 have been amended to include the allowable subject matter of claim 23. Claim 19 has been amended to change its dependency from a cancelled claim. No new matter has been added. Claims 17, 19-21, and 25-29 are now pending in this application.

Reconsideration of the application in view of the above amendments and following remarks is respectfully requested.

Allowable Subject Matter:

Applicants' attorney, Benjamin Han, conducted a telephone interview with Examiner Kaplan on March 23, 2009. Applicants' attorney thanks Examiner Kaplan for the courtesies extended by the Examiner during the interview. During the interview, the allowable subject matter of claim 23 was discussed. Specifically, the Examiner indicated that amending the independent

¹ Applicants note that Hirai is cited in the rejection of claims 22, 28, and 29, and assume that the Examiner intended to reject claims 22, 28, and 29 as unpatentable over Phelps, Doemens, Jang, Jaenker, Kurakawa, and Hirai.

claims to incorporate some features of claim 23 would likely be sufficient to overcome the current rejections. The Examiner further indicated that amending the independent claims to incorporate all of the features of claim 23 would likely place the independent claims in condition for allowance.

As discussed below, independent claims 17, 28, and 29 have been amended to incorporate all of the features of claim 23. It is respectfully submitted that each of the pending claims are now in immediate condition for allowance.

Allowable Subject Matter:

Applicants appreciatively acknowledge the Examiner's indication that claim 23 includes allowable subject matter and would be allowable if rewritten in independent form. Although Applicants respectfully disagree with the Examiner's rejections as discussed below, in the interests of furthering prosecution, claims 17, 28, and 29 have been amended to essentially include the features of allowable claim 23, and all intervening claims.

It is respectfully submitted that each of the pending claims are now in immediate condition for allowance.

Objections to the Claims:

Claim 29 was objected to for having informalities. Specifically, the Examiner indicated that "these half-waves;" should be "theses half-waves; and". In response, claim 29 has been amended to address the Objection.

Withdrawal of the objection to claim 29 for having informalities is respectfully requested.

Rejections of claims 17, 20, and 21 under 35 U.S.C. §103(a):

Claims 17 and 20-21 were rejected under 35 U.S.C. §103(a) as being unpatentable over Phelps in view of Doemens and Jang.

Phelps describes a dual rotor helicopter having hydraulic rotor pitch and roll control actuators 120 and 122. *See Phelps*, col. 9, lines 42-44; col. 10, lines 10-13. The control actuators 120 and 122 are located on the L-shaped frame of the helicopter and merely "tilt the counter-

rotational gear drive 26 and rotor set 16 with respect to the airframe 12.” *See* Phelps, Figure 8; col. 10, lines 5-10.

Doemens describes an arrangement for measuring the torque of a rotor using magnetic coupling. *See* Doemens, col. 1, lines 15-20. The arrangement configures the rotor and stator coils to induce fluctuations in the magnetic coupling of the coils so that the angular position and/or speed can be derived from the fluctuations. *See* col. 2, lines 7-12.

Jang describes a contactless energy transmission system providing regulated power to a load. *See* Jang, col. 1, lines 9-12.

Amended independent claim 17 recites a device for contactless electrical power transmission in a rotary wing aircraft including an inductive transformer having a secondary winding disposed on the rotor shaft of the rotary-wing aircraft and “at least one actuator control element connected to the secondary winding.” It is respectfully submitted that Phelps, Doemens, and Jang, alone or in combination, do not teach or suggest at least this feature of the presently claimed invention.

Phelps describes control actuators 120 and 122 that are not disposed on a “rotor shaft,” but are merely located on the stationary airframe 12 of the helicopter. *See* Phelps, Figure 8; col. 9, lines 41-44; col. 10, lines 5-10. These actuators are not located on a moving body, but merely move and tilt the rotor axis relative to the stationary airframe 12. *See* Phelps, Figure 8; col. 9, lines 41-44; col. 10, lines 5-10. In contrast, the presently claimed invention is directed to a system providing power and control, for example, from a stationary part to actuators disposed on rotating blades of an aircraft via control elements disposed on the rotating rotor shaft of the aircraft. *See* Specification, Figure 8; ¶[0076].

Additionally, the arrangement of Doemens is not comparable to inductive transformer of the presently claimed invention. The arrangement of Doemens relies on magnetic coupling and the fluctuations of voltage to provide various mechanical measurements of a rotor. *See* Doemens, col. 1, lines 15-20; col. 4, lines 35-50; col. 2, lines 7-12. Thus, the arrangement of Doemens intentionally induces fluctuations in voltage to provide mechanical measurements regarding the rotor. Induced fluctuations in voltages from movement do not allow the arrangement of Doemens to provide specified power and control to any electrical circuit. In contrast, the inductive

transformer of the presently claimed invention, for example, allows the transmission of power and control by bridging an isolating point between a "stationary portion of the rotor shaft bearing" and "the rotor shaft," as recited in claim 17.

Further, the arrangement of Doemens is incompatible with the disclosure of Phelps. Phelps does not require the transmission of any signal between a rotating rotor and a stationary stator. As described above, the actuators are located on the stationary airframe of the helicopter, and there is nothing on the rotating blades that would require the transmission of electrical energy and/or signals from the airframe to the rotor blades. Additionally, Jang does not cure the deficiencies of Phelps and Doemens.

Thus, for at least the reasons discussed above, any combination of Phelps, Doemens, and Jang, to the extent proper, does not render independent claim 17, and dependent claims 20 and 21, obvious.

Rejections of claims 18 and 19 under 35 U.S.C. §103(a):

Claims 18 and 19 were rejected under 35 U.S.C. §103(a) as being unpatentable over Phelps in view of Doemens and Jang, and further view of Jaenker.

Jaenker merely describes an airfoil member with piezoelectric stack actuators.

Claims 18 and 19 depend from claim 17 and Jaenker does not cure the deficiencies of Phelps, Doemens, and Jang. Accordingly, any combination of Phelps, Doemens, Jang, and Jaenker, to the extent proper, does not render dependent claims 18 and 19 obvious.

Rejection of claim 25 under 35 U.S.C. §103(a):

Claim 25 was rejected under 35 U.S.C. §103(a) as being unpatentable over Phelps in view of Doemens and Jang, and further in view of Naitoh.

Naitoh merely describes a magneto-impedance element made of an alloy having a mixed texture. See Naitoh, Abstract.

Claim 25 depends from claim 17 and Naitoh does not cure the deficiencies of Phelps, Doemens, and Jang. Accordingly, any combination of Phelps, Doemens, Jang, and Naitoh, to the extent proper, does not render dependent claim 25 obvious.

Rejections of claims 26 and 27 under 35 U.S.C. §103(a):

Claims 26 and 27 were rejected under 35 U.S.C. §103(a) as being unpatentable over Phelps in view of Doemens and Jang, and further view of Hirai.

Hirai merely describes a non-contacting transfer apparatus. *See* Hirai, Abstract.

Claims 26 and 27 depend from claim 17 and Hirai does not cure the deficiencies of Phelps, Doemens, and Jang. Accordingly, any combination of Phelps, Doemens, Jang, and Hirai, to the extent proper, does not render dependent claims 26 and 27 obvious.

Rejections to claims 22, 28, and 29 under 35 U.S.C. §103(a):

Claims 22 and 28-29 are rejected under 35 U.S.C. §103(a) as being unpatentable over Phelps, Doemens, Jang, and Jaenker, and further in view of Kurakawa et al. (Japanese Patent No. 07-046864).

As noted above, the Examiner references Hirai in rejecting claims 22, 28, and 29. Thus, Applicants assumed that the rejection of claims 22, 28, and 29 was made in view of Phelps, Doemens, Jang, Jaenker, Kurakawa, and Hirai.

Kurakawa appears to describe a sensor that provides an error in position as feedback in controlling a piezoelectric actuator. *See* Kurakawa, Abstract.

With respect to claim 22, claim 22 depends from claim 17 and Kurakawa does not cure the deficiencies of Phelps, Doemens, Jang, Jaenker, and Hirai.

With respect to claims 28 and 29, independent claims 28 and 29 recite a method to provide power of at least one capacitive actuator including impressing positive and negative half-waves (or portions thereof) into the "actuator...[so that] a length change of the actuator occurs in a desired direction in each half-wave." As described in the specification, the power semiconductors are controlled, for example, in such a way that a positive polarity supplies power to the actuator and a

negative polarity withdraws power from the actuator. *See* Specification, ¶[0021]. It is respectfully submitted that the cited references, alone or in combination, do not teach or suggest at least this feature of the presently claimed invention.

The circuits of Hirai and Jang cited by the Examiner do not supply both positive and negative half-waves to their respective loads, and are only able to supply a signal having a single polarity. Both Hirai and Jang include rectifying circuits. Hirai includes a rectifier 364₁ made up of “a filter and bridged diode.” *See* Hirai, Figure 35; col. 26, lines 15-18. Further, Jang includes a zero-voltage switched full-bridge rectifier. *See* Jang, Figure 4. One of ordinary skill in the art understands a rectifier to create an output waveform having a single polarity from an AC waveform having both positive and negative polarities. Thus, neither circuit provides a signal have both positive and negative polarities.

Further, since Kurakawa apparently requires a signal having both positive and negative polarities, the disclosure of Jang and Hirai are incompatible with Kurakawa.

Thus, for at least the reasons discussed above, any combination of Phelps, Doemens, Hirai, Jang, and Kurakawa, to the extent proper, does not render independent claims 28 and 29 obvious.

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CONCLUSION

In view of the above amendment, Applicants believe the pending application is in condition for allowance.

No fees are believed to be due with the filing of this response. In the event of a fee discrepancy, please charge any fees due in connection with this filing to Deposit Account No. 04-0100 referencing Docket No. 20800/0204884-US0.

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Respectfully submitted,

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